Session 9A: Transportation

What technologies, research pathways, and market changes are needed to reduce energy intensity?

I. What energy efficiency technologies are out there?

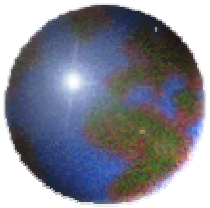
II. What technologies and research pathways would be needed to support future intensity reduction efforts?

III. What is the role of policy, industry, and the public?

"You can tell whether a man is clever by his answers. You can tell whether a man is wise by his questions." ancient proverb

Dan Sperling

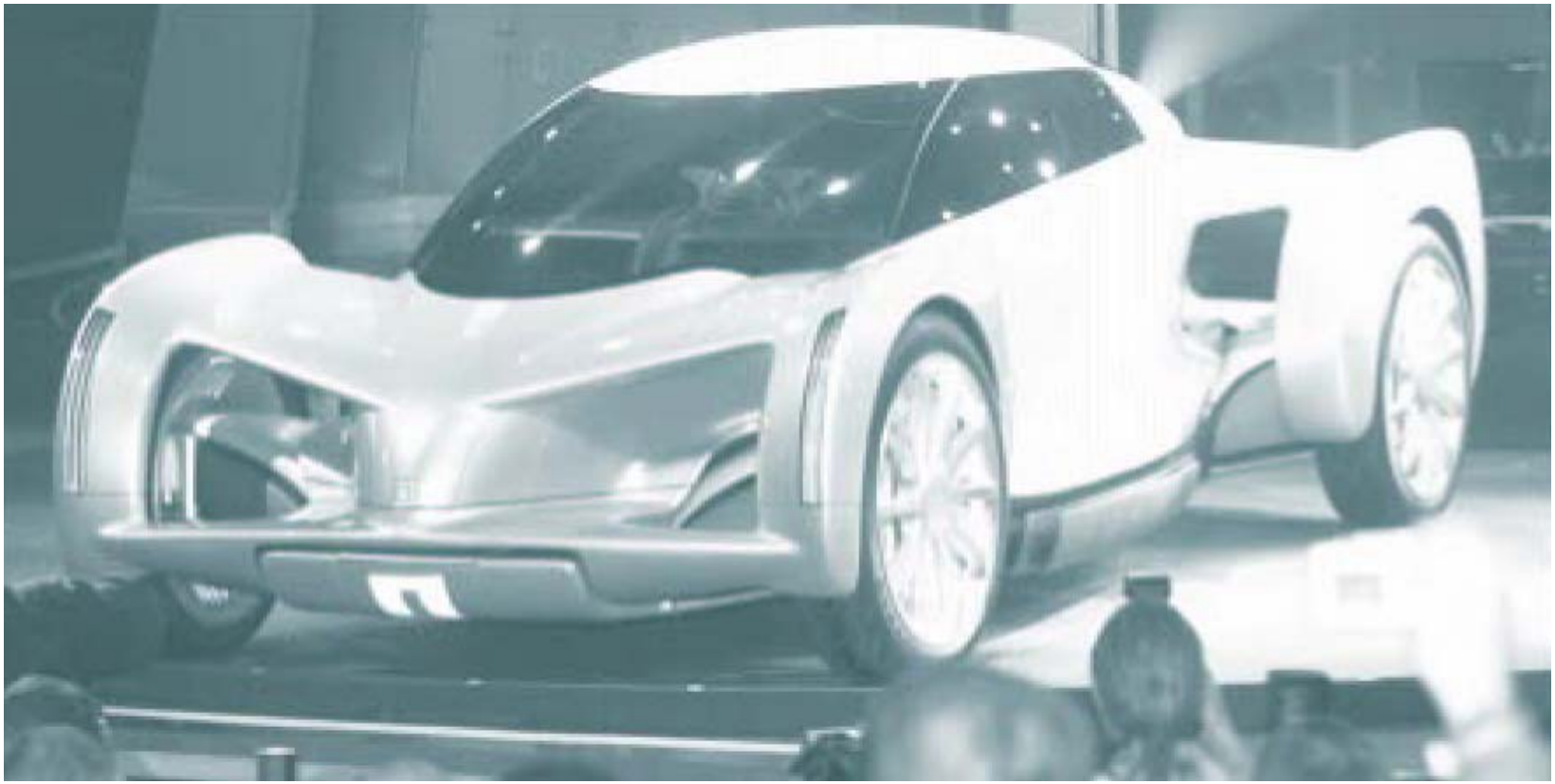
University of California, Davis



I. *What energy efficiency technologies are out there?*

Green car/truck technologies and fuels?

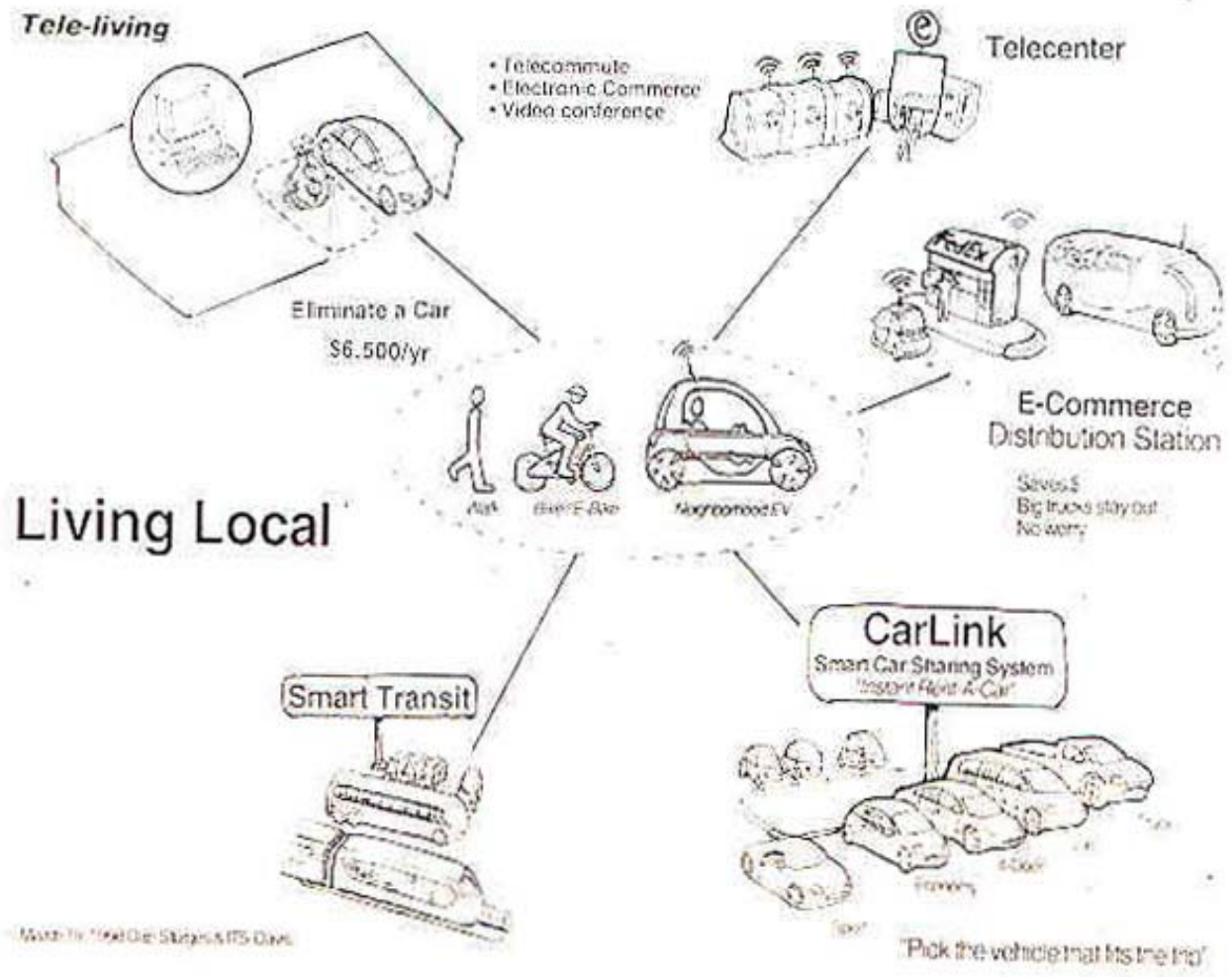
GM Autonomy Fuel Cell Concept Car



II. What technologies and research pathways would be needed to support future intensity reduction efforts?

- Enhanced ICE technology (SI and diesel)
- Cleaner ICE fuels (esp to facilitate LD diesel) and low-carbon fuels
- Hybrid electric technology
- Battery/ultracapacitor cost and performance
- Hydrogen storage and distribution
- Fuel cells
- Smart "new mobility" systems: smart car sharing, smart paratransit, dynamic ride sharing, more diversity and specialization of vehicles (beyond DOT?!).

New Mobility System



Source: Dan Sturges, ITS-Davis/GEM/DCX

III. What is role of policy, industry, and the public?

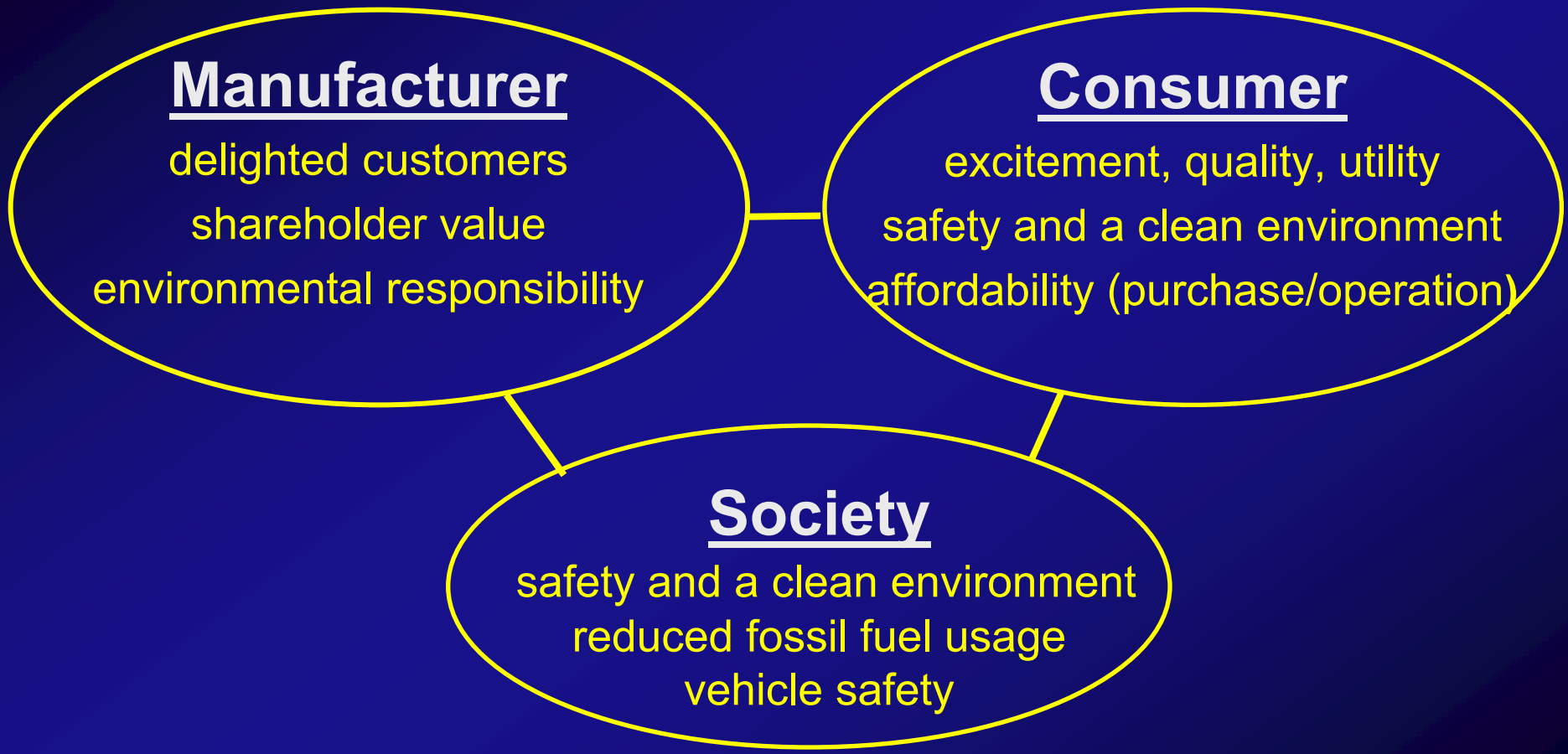
Role of Government (DOE) R&D

Gov't R&D is most effective when

- Targets technologies far from commercialization ***and*** with potentially large societal benefits
- Directed at basic research
- Relevant industries are fragmented and have low R&D budgets

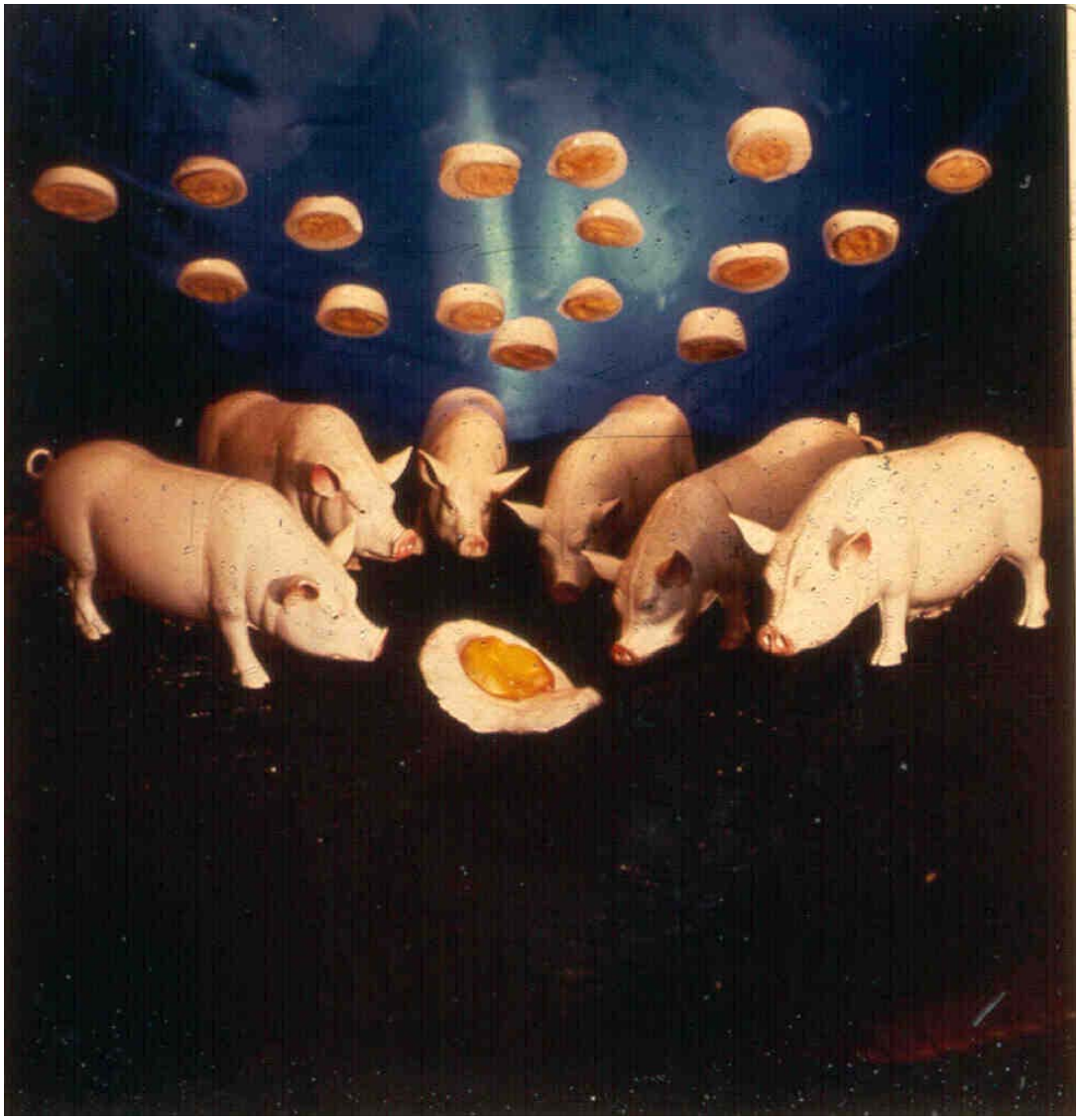
Need a more strategic approach to public R&D (how much and of what type to national labs, universities, technology companies, etc) (note PNGV evolution).

Overlapping and Sometimes Competing Goals



What is the responsibility of industry and policymakers? Leadership??

How much commitment to change can we expect from car companies, oil companies, politicians, labor unions?



Comments on Energy Efficiency Improvements

Bernard Robertson says huge improvements have been made in automotive fuel efficiency ….. and that is true.

But fuel efficiency does not equal fuel economy.

Efficiency improvements were used for size, power, accessories

Implications??

Will advanced technology be used for more "luxury enhancements" and not fuel economy improvements?

Clearly there is an important role for policy to assure that larger societal interests are taken into account.

Light duty diesels??

Bernard Robertson says light duty diesels will improve energy intensity ***and*** fuel economy.

Yes, that is true. But they have relatively higher NOx & PM.

Should diesel emission stds be softened (as in EU)?

To what extent would softening of stds facilitate penetration of LD diesels?

Again, policy plays a central role with this technology.

Bernard Robertson says

"Advanced technology is the only opportunity for improved fuel economy that is actionable by automakers" Bernard Robertson, DCX

Role of automakers (and "energy" companies)?

- Simply follow the market?
- Automakers: $7 billion/yr advertising budget in US
- Influence on lawmaking and policymaking?
  - Feebates? Fuel taxes? Fuel quality? Enhanced CAFE?
- Social/corporate responsibility (2 largest industries in world)?
- Automakers agreed to 25% reduction in EU and (22%) in Japan

Role of policy?

- Lead or follow major vested interests (labor unions, OEMs, etc)?
- Public interest?
- International responsibility? (US is by far largest energy user and richest country in world)

I believe [corporate social responsibility] is the most important issue facing the automotive industry - and industry in general - in the 21st century… includes anything that impacts people and the quality of their lives."

William Clay Ford, Jr, January 2000

"Is Technology Enough -- to Achieve Energy and Environmental Goals for Transportation?"

1995 Asilomar Conference on Transportation and Energy

- Answer at conference was definitive "no"!! Technology advances and R&D are a necessary but not sufficient condition.
- Unfortunately, strategies are entangled in a confusing mix of beliefs, values, and vested interests.
- Most trends are in "wrong" direction: bigger and more fuel-consumptive vehicles, almost total dependence on cars for pass travel, increasing dependence on trucks for freight, rapid increase in airline fuel consumption, "monoculture" transportation system (fuels, vehs, roads, travel).